PROJECTS

TO WORK ON

Bombay Natural History Society

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The **GREEN TEACHER'S KIT** is designed as a resource manual for teachers, advisers and others responsible for Environmental Education in Secondary Schools. It aims to enhance the teacher's aptitude and attitude towards the approaches in Environment Education. It especially equips the teachers with authentic knowledge on natural history which is vital for nature education.

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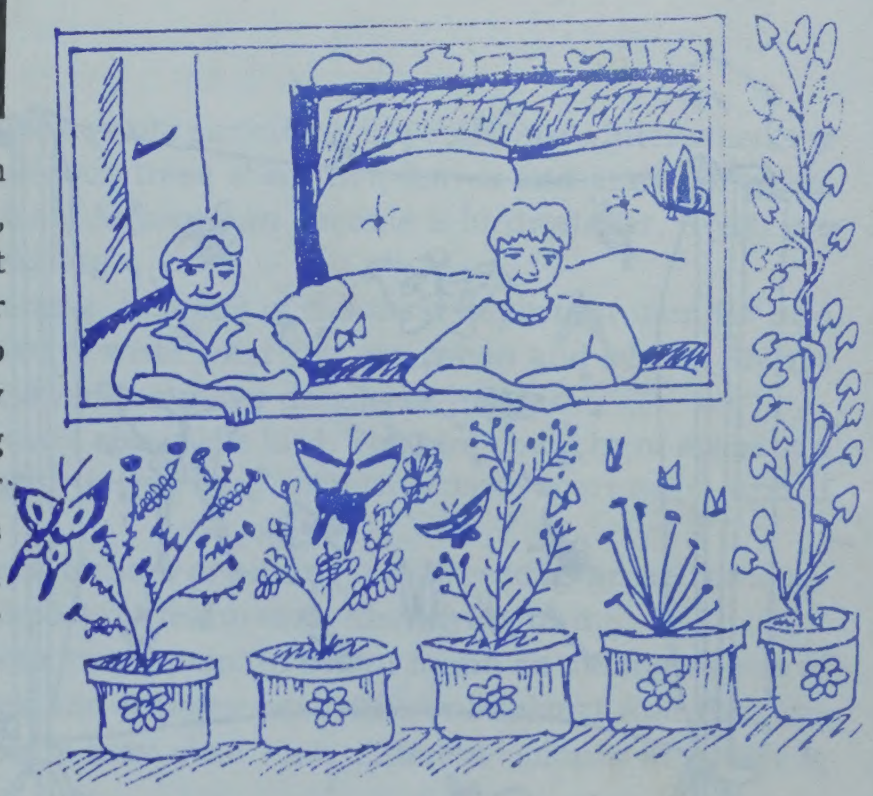
The Bombay Natural History Society was founded in 1883. Today it is the largest non-governmental organisation (NGO) in the Subcontinent engaged in the conservation of nature and natural resources, education and research in natural history, with members in over 30 countries.

1. ATTRACTING BUTTERFLIES AND MOTHS INTO YOUR GARDEN

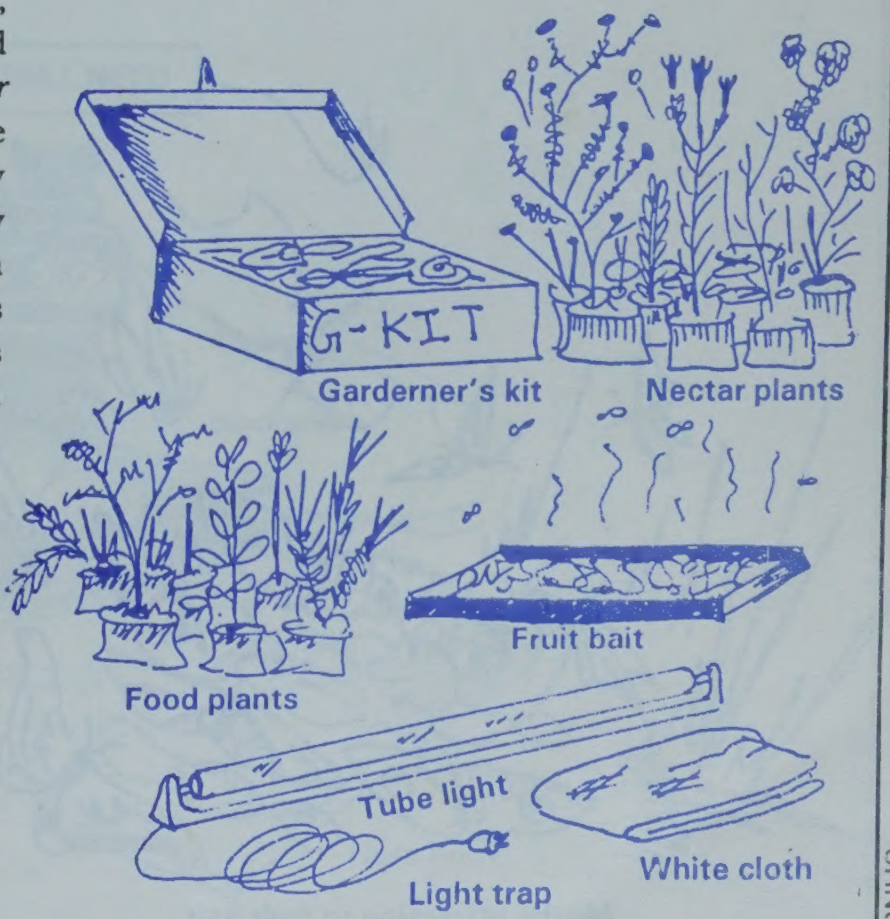


You will be surprised to know your garden flowers like lilies, gladioli, roses, dahlias, chrysanthemums and begonias fails to attract butterflies. Instead, these insects would rather settle on a yellow lantana or a pink cockscomb growing wild along the road. They generally prefer purple, yellow and pink flowers. Among wild flowers, the hardy lantana is the best for attracting butterflies. Its tiny bunched flowers are all-time favourites of these insects. With the right type of plants grown in the garden or even in pots on the balcony or windows sill, attracting butterflies is not difficult. Marigold, cosmos, periwinkle, mexican suntlower and *verbena*, which can all be grown from seeds, are great favorites. Flowers of *nirgudi* and poinsettia too attract butterflies.

Planting foodplants for butterflies to lay eggs on, is also an interesting way of gardening for butterflies. A lemon plant and curry-leaf plant or *kadipatta* will bring the common mormon, a black butterfly with red spots and line. a yellow spotted butterfly to lay eggs. Saplings of *amaltas* or Indian laburnum and other cassias planted in pots will invariably attract a milky green Emigrant to lay eggs. A fast flying green spotted, tailed jay prefers to lay eggs on *sitaful* or custard apple trees or false ashok or mast tree. *Kanher* or oleander, banyan, peepal are favorite foodplants of Common crow, a black butterfly with white spots on its margin. With these few plants around the house, one can watch butterflies from one's doorstep. Along with plants favoured by butterflies, if one can also plant, plants favoured by moths, then certainly your garden will have visitors even during the night.

Garden plants such as lantana, bitter hedge, *gulbaksi* or evening primrose, *terda* or balsam, petunia, *sadapuli* or periwinkle, white spider lilies and verbena are mostly visited by moths for nectar. As butterflies have their favourite foodplants to lay eggs similarly moths also have a list of plants as their foodplants. Most of them are again common garden plants; such as mango, *jamun* and coral, *ber*, Indian almond, *anant*, bitter hedge, oleander, castor, tagar or Indian rosebay and common jasmine.

YOU WILL NEED



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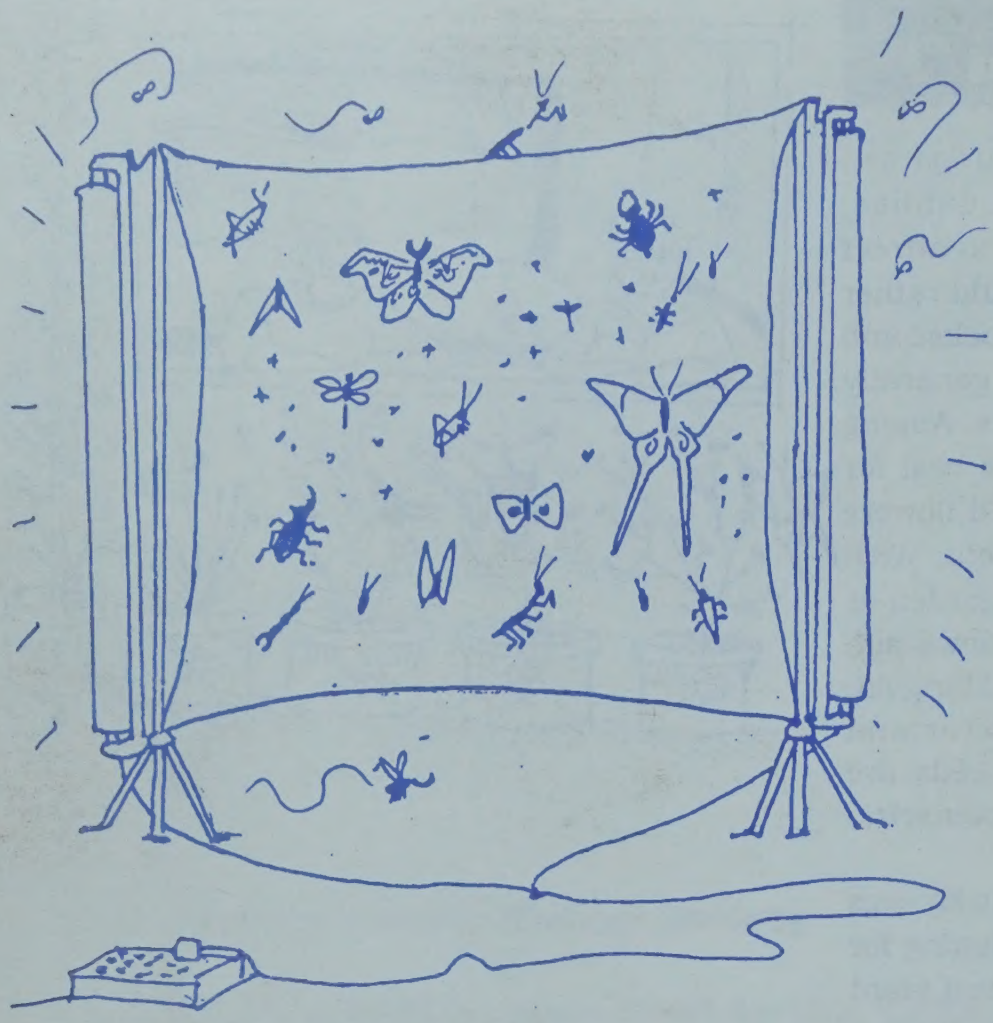

Insect light trap

Once you know that the moths have actually found your garden, you can discover much more about these insects by hanging a sheet of white cloth outside and affixing a light bulb or tube light over the sheet. Insects will be attracted to your 'light-trap' from far and near. You can be sure that several moths will be among these visitors. Most will settle on the sheet, which provides enough contrast for you to examine them well.

There are some tricks of the trade you might like to know about. Keep a vigil on a new moon night and your results will be better. Put some over-ripe guava, banana or pineapple out in the open and the types of moths and other night fliers attract will astound you. Always note down on your observations, these will help you compare different moth visitors. Of course, you should keep a note of preferred plants for food and egg-laying. Very soon you will discover much more about the natural history of moths. In the process, you may even stumble upon new information, unknown to science. Remember that you can always compare your observations with those of others by referring sources such as BNHS Journal and other references on entomology. Unique observations may even be published by such journals.

(Happy butterfly and moth watching)

Moths attracting to fruit bait

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2. BIRD WATCHING

Like any other hobby, bird watching can be equally enriching. Especially in winter when the mornings are cool with sunny skies. The deciduous trees shed their leaves and start flowering, which is right place to find nectar-seeking birds. Anyone can become a birdwatcher, if you are interested, then here are few tips on bird watching.

No birdwatcher should be without a notebook, it is one of the most important item for bird watching. One should not rely on memory. Always write what you see, when and where. Always try to take full description of birds you see, and note as many details as you can.

Size: The foremost important point is to write size of the bird. The bird could be of a size of a sparrow, myna, crow or eagle. If the bird is slightly bigger than a sparrow write sparrow (+) and if less then write sparrow(-) and son on.

Shape: Look at the shape of a bird. It may be slender or plump, it may be long-necked or long-tailed, or with long or short legs. These are important features in identifying bird.

Colour: Usually one colour dominates. Note this dominant colour found on different parts of the bird. Remember that in many birds, males and females have different colours and that the young-ones also may look different. Some birds may even have different colours at different times of the year.

Beak: There are different shapes of beaks depending on the food they eat. Note the shape, size and colour of the beak.

Location: Make a note where you saw the bird e.g. on a tree, in water, on land, in bushes etc.

Migratory Birds: Some birds are seen only in a particular season. They migrate from far off places, even from other continents. They can be seen only in particular months. Write the date and month when you see such birds.

Identification of Birds: After collecting the above data, please refer to books on birds. BNHS publication's Dr Sálim Ali's *Book of Indian Birds* is the best book which any beginner can refer to. Coloured plates with brief information is just an ideal book for any beginner.

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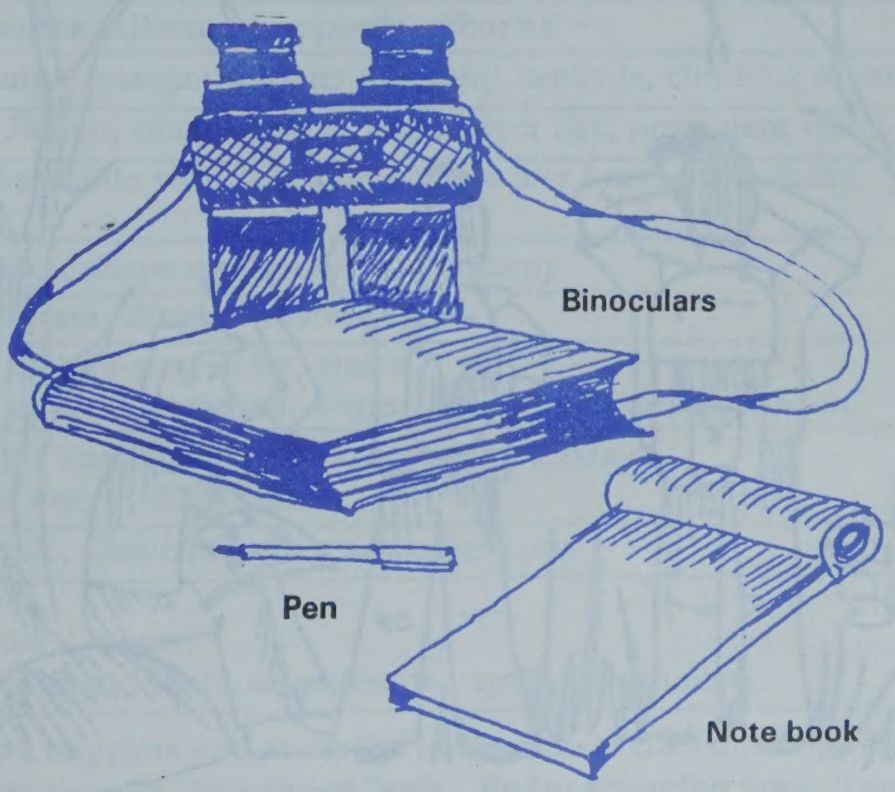

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Important Instructions for Bird watching:

a) If you sight a bird, try to be quiet, talk softly and as little as possible, observe carefully as much as you can. If you want to go closer to a bird, don't do so abruptly. Pretend as if, you are not interested in it and approach casually.

b) Observe your bird carefully and note down your observations immediately or you may forget important aspects by the time you reach home.

c) If you are not certain of any aspect in description, don't record it

d) Birds are very active early in the morning, hence it is best time for bird watching.

e) Always remember that a bird is more important than your bird watching. Do not throw stones and make bird fly to have a good look. Never disturb a bird on the nest.

f) Avoid sudden movements as this may disturb birds.

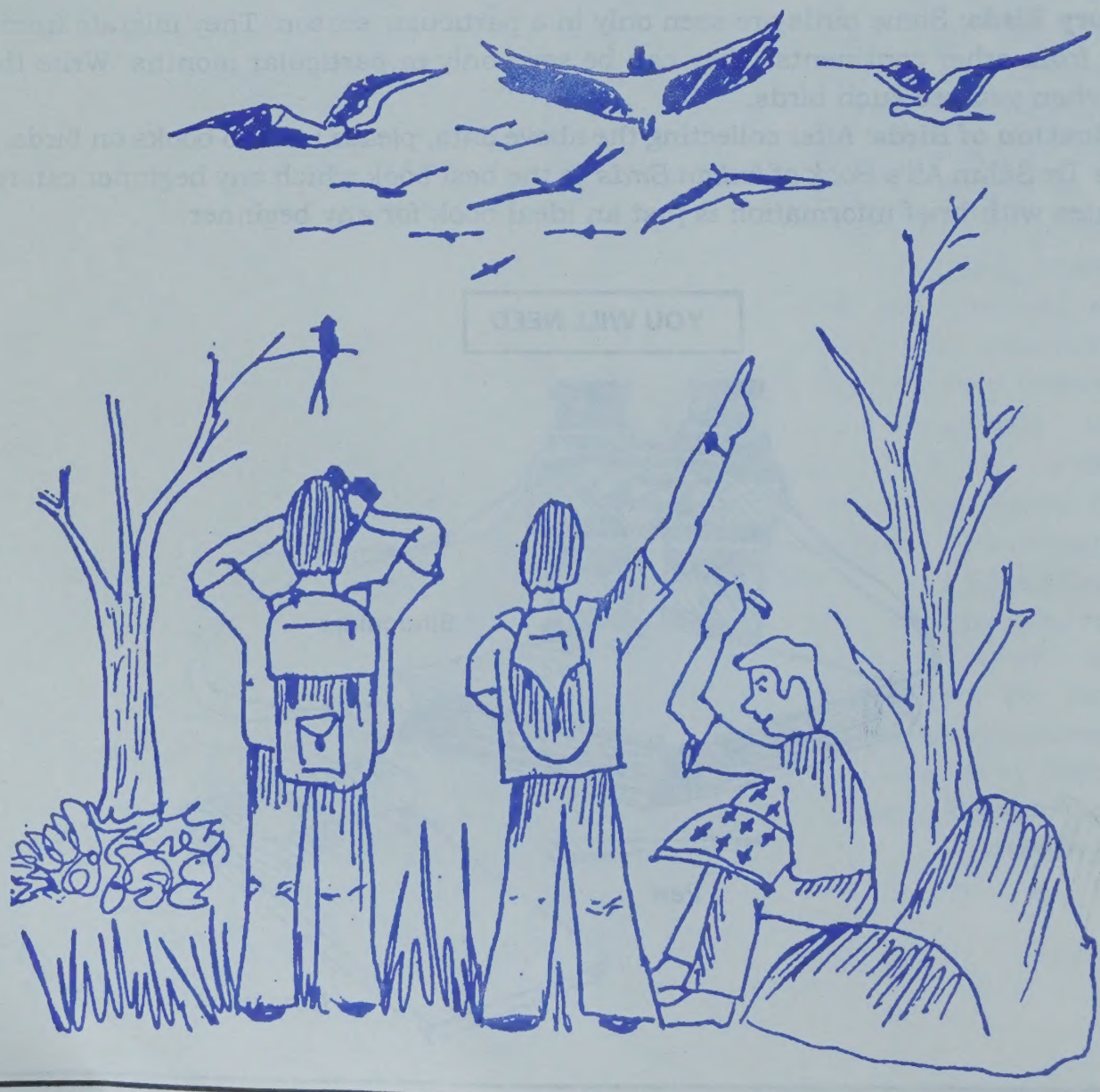
g) Be prepared to stop frequently to watch and listen. Half an hour spent sitting on one spot can be very fruitful.

h) Try not to step on fallen dried leaves and twigs, sound of which is often disturbing to birds.

i) Binoculars are an important tool for a birdwatcher. Always consult a birdwatcher before buying a pair of binoculars. Most birdwatchers prefer a magnification of between 7 and 8. All binoculars are marked with figures like 8 x 40, which means that magnification is 8 times and diameter of the object lens is 40 mm. Ideal combination is 8x40.

j) Lastly for doing good bird watching silence, patience and pursuance is required.

Happy birdwatching!



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3. STUDYING TREES AROUND YOU

Botany is the study of plants and the first step towards being a botanist is to first start knowing the trees around you. There are many aspects one can learn and observe about trees. How is the soil and climatic conditions in which the plant grows, what is the flowering season, whether it is a deciduous or an evergreen tree, how are the arrangement of leaves, flowers etc, what life is found on that tree (insects, birds, reptiles etc), are there any mythological stories or fascinating facts about that tree. Make an observation of one tree or plant and note your observation in the under given format:

Here are some guidelines to study the trees around you.

1.	**Name of the tree**: common/local name botanical name	
2.	**Location**: Forest/ farm, near stream / pond, or barren patches, high hills, slopes, ridges, city etc.	
3.	**Type of soil**: black/red etc	
4.	**Nature of the tree**: Evergreen/ semi-evergreen/deciduous	
5.	**Texture of bark**: Rough, smooth, cracks-vertical, horizontal or both, or flakes, knobs etc. Note and describe bark patterns also if prominent.	
6.	**Arrangement of leaves**: Alternate, opposite, whorled	
7.	**Type of leaves**: Simple/compound ,any specialty, tendrils, climbing organ	
8.	**Texture of leaves**: Rough, smooth, waxy, sand paper like, prominent veins	
9.	**Shape of leaves**: Associate with common objects like heart, arrowhead or oval etc.	
10.	**Size of leaves**: Sketch shape and record dimensions	
11.	**Arrangement of flowers**: Single, clusters etc.	
12.	**Flowers**: Describe flowers-size, color, shape, smell etc. Number of petals, stamen, stigma etc. and flowering season	
13.	**Fruits**: Describe fruit size, colour, shape seeds, methods of dispersal if possible and fruiting season.	
14.	**Economic use**: Edible, medicinal, fuel, any other uses.	
15. a) b)	**Life found around it**: Epiphytes / parasites / other; Animals-mainly insects and birds, amphibians, reptiles, mammals.	

You can also take the bark imprints and make the herbarium of the flowering twigs and leaves of the tree or plant or draw them in your observation book. ***Enjoy knowing your trees !***

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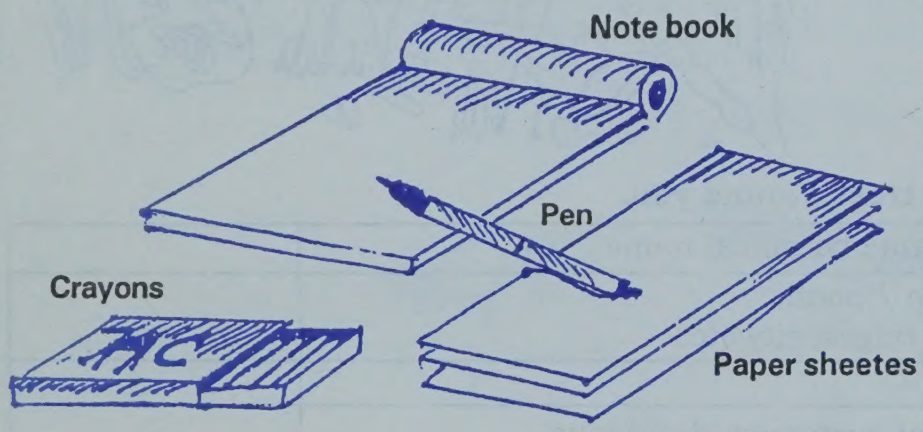
4. TAKING BARK AND LEAF IMPRINTS

Just like us, the trees also have their own identifies in the form of leaves, flowers and fruits, but mostly the tree autograph is famous for its bark signatures. Anyone who is interested in collecting these autographs can easily get it by placing a plain paper on the tree trunk and rubbing it with a crayon. The impression of the bark texture will be imprinted on the paper. The ridges will be coloured, while the cracks in the bark will remain blank. If possible match the colour of the bark with the crayons you use, or describe the colour alongside the autograph. Try this with different kinds of trees and compare. Take impressions of the different barks on paper and store them with the name of the tree in your records.

YOU WILL NEED



Similarly you can take leaf imprints of the respective trees. Take one leaf and place a plain paper on the reverse of the leaf where the veins are prominent to touch. Now, rub it with the crayon. You can use different shades of green to colour. With the bark and leaf imprints your autographs are now ready to be pasted in a nature diary. ***Have fun with leaves and barks!***

5. MAKING A COMPOST

Garbage is one of the major problems faced by any metropolitan city. It is estimated that 1 kg. garbage is produced by each household everyday. It is also known that most of the rubbish is kitchen waste and other organic waste which is biodegradable that all goes into the public dumps. Instead stressing our environment by adding to our ever-growing dumps, you will be surprised that the same can be used to beautify the environment by organically fertilizing our gardens. This is possible by composting your kitchen and other biodegradable waste.

Compost is humus, the nutrient-rich, crumbly remains of decomposed organic matter. Correctly made, it is pleasant to handle and doesn't smell bad. The organic matter is broken down into humus through heat and the action of dwelling creatures (ants, bacteria and worms) and

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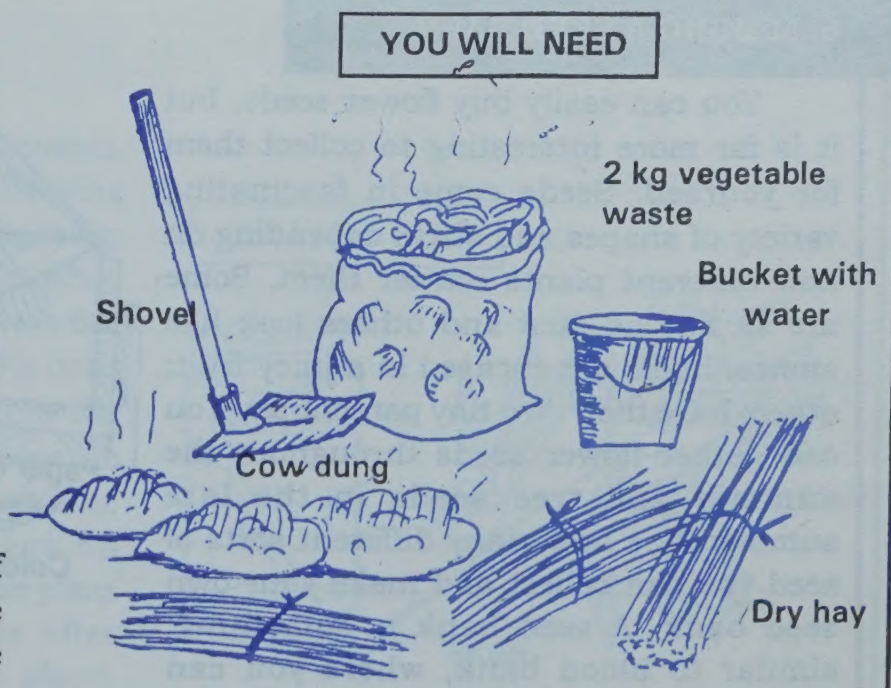
fungi. You need a garden because the compost heap must stand in soil, so that worms and other soil animals can enter. Anything organic can be composted: vegetable scraps, fruit peel, tea leaves, egg shells, bones, grass etc. You can even compost tough things like newspapers, old clothes and even straw mats! However these tough things will take longer time to decompose therefore should be chopped up into very small bits before being added to the compost heap.

Make a pit with a shovel nearby house of about two feet depth. Collect the vegetable waste from your house and put it inside the pit. Put some water, cow dung and dry hay. Finally before covering with the soil, put some water over it. Let it remain for two weeks. After two weeks, dig out the same pit and see what changes has taken place. By this time, the vegetable starts decomposing and will give out a bit of smell. Turn the waste over to ensure proper mixing and aeration and add some more water and cow-dung and cover the pit by filling the soil. Your compost is about to get ready. Within next two weeks the organic waste thrown in the pit turns completely into the wet compost. This compost is now ready to be used as a manure for planting new saplings.

In order to have a good compost, ensure that you don't add lots of orange and lemon peels to the heap as it takes long time to decompose and too much of it will make the compost too acidic, which will harm your plants. Also don't add cat or dog faeces to the heap which may contain harmful bacteria which can survive the composting process and make your compost smell bad. If your heap is placed near plants, it may be necessary to add extra-nitrogen-rich elements (green leaves, vegetable, egg shells). Micro organisms pull nitrogen from the surrounding area to help break down the compost waste, and this may leave nearby plants starved of nitrogen. Adding extra nitrogen to the heap means the microorganisms won't need to plunder the surrounding soil.

Enjoy composting!



Transection of a compost pit

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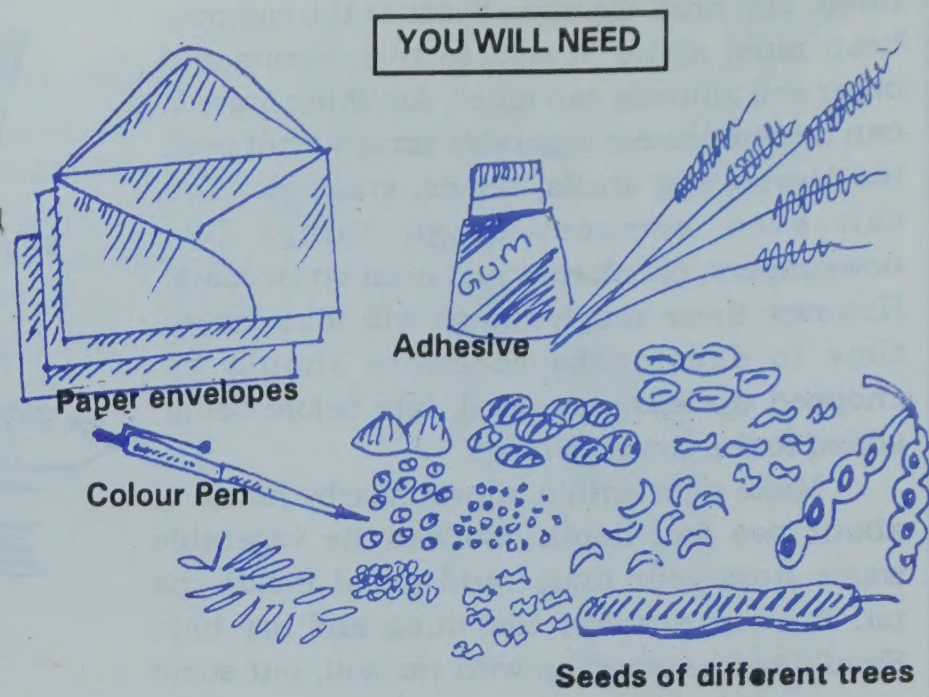
6. MAKING A SEED BANK



You can easily buy flower seeds, but it is far more interesting to collect them for yourself. Seeds come in fascinating variety of shapes and sizes, depending on how different plants scatter them. Some are as fine as dust and others look like stones. Some are encased in a juicy fruit; others have their own tiny parachutes. You can gather flower seeds throughout the summer and tree seeds in the late summer. See how many different sorts of seed you can collect and make your own seed bank. A seed bank is something, similar to blood bank, where you can collect the seeds of different trees, label them and use them to make a small nursery by growing these seeds into saplings during rainy season when there is enough water available for plantation.

You will need a small paper envelops, seeds of different trees, adhesive and colour pen.

You may be able to find grains like wheat along the edges of farmland in summer. If not, collect different types of seed from wild grasses. Look for dried flowers whose seed head has been formed. The seeds are ripe when they are brown. Cut off the seed head and shake the seeds into a paper bag. You can also collect fruit seeds which are either in form of pips that is found in apples and oranges and others have stones such as mangoes and dates. Besides fruit seeds you can also collect all the different sorts of dried beans and peas. The best time to collect tree seeds is late summer, when they have just fallen from the trees. If you leave it too late, many seeds will have been eaten by birds and animals. After you had collected seeds to raise a nursery, you need to preserve them till you plant them. Sort out the seeds collected into their groups then take small paper envelops write the individual plant name on it and pour the seeds into it. Keep it sealed in a dark and dry place in a safe place which is pest free. You can use your seed bank when you want to set up your own nursery. ***Happy seed banking!***

Seed Bank

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7. REARING CATERPILLARS

Butterflies are one of the most beautiful insects. For their brilliant colours they are often called as Flying Jewels. But do you know that these flying beauties really don't look the same when they are young. Infact, they don't fly, but crawl and don't feed on nectar of flowers but eat lots of green leaves. Caterpillars are the young ones of the butterflies, which hatch out of the eggs laid by the mother butterfly. Among the butterflies, the mothers are very particular about the food eaten by their young ones, that's the reason a butterfly doesn't lay eggs on everything that's green. She is particular about the plant on which she will be laying eggs. Young ones after hatching starts eating the leaves of the same plant, which becomes the food plant of the caterpillar. Please always remember that the caterpillar will not feed on any plant other than its food plant.

It may happen that one of your garden plants of *Kadipatta*, *Lemon*, *Rui*, *Tamalpatra*, Oleander or Bryophyllum will be having some of the butterfly caterpillars. Watching the caterpillars turn into a beautiful butterfly, is a rewarding experience. If you want to witness this change, just pick up a caterpillar found on any of the above mentioned plants. Take a clean, wide-mouthed plastic jar (double the size of a jam jar) and make some holes in the lid, which will allow the air to enter into the jar. You can also use cardboard boxes. Place the caterpillar inside the jar with few leaves of its food plant. Feed the caterpillar every day with fresh leaves and take efforts to clean the jar every day. Within a few days you will find your caterpillar growing big and a day will come when it will stop feeding and start wandering restlessly. You may also observe a change in the body colour and this is the time when you should provide some dry stems or twigs, which will be used by the caterpillar for pupation.

Soon you will find a structure attached to the twig, within which the caterpillar's body is shaping up into a butterfly. Within a week, you can see the pupa getting darker and the glimpses of future butterfly begin to show. You may be thrilled and surprised to see one morning, a beautiful butterfly inside your jar. Congrats! You have successfully reared a caterpillar into a butterfly. Release your butterfly and enjoy the moment when it takes off in the air. You can record your findings in the format, given below.

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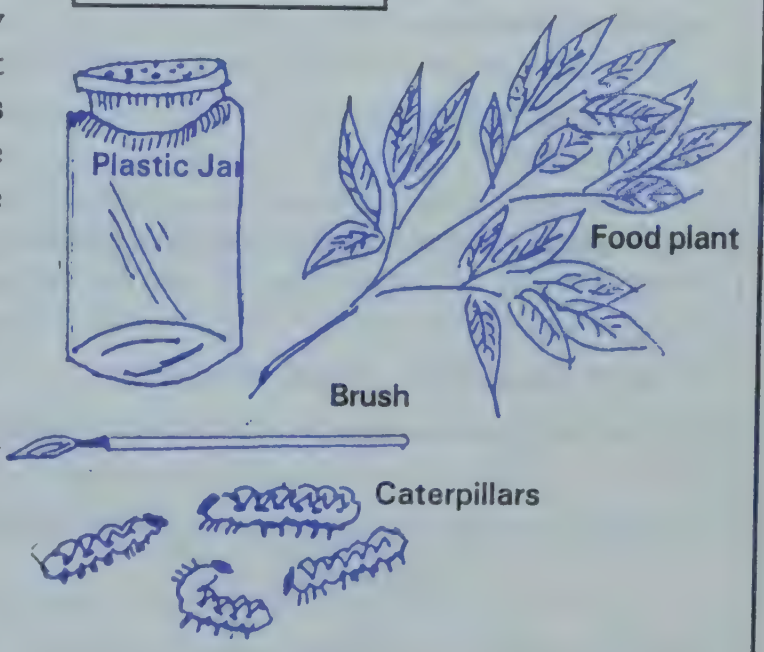

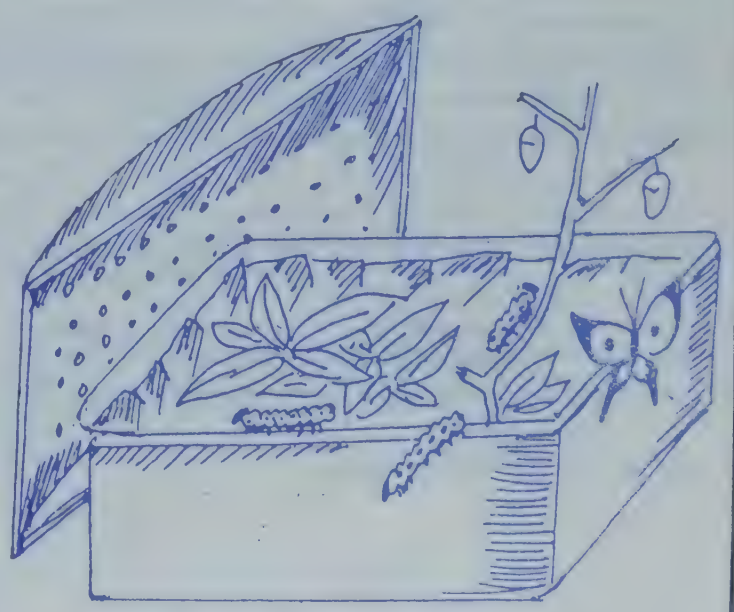

Butterfly rearing box

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LIFE HISTORY DATA SHEET	
Name of the Butterfly	Common Name : Latin Name :
Name of the Foodplant on which the caterpillar/ egg was collected	Common Name : Latin Name :
Type of the Foodplant	Tree/Shrub/Herb/Climber Evergreen/Deciduous/seasonal
Description and size of the Egg/Caterpillar (from the day of collection till the day of pupation)	
No. of feeding days of the caterpillar **Did the caterpillar moult (shedding of skin)?**	If yes, then how many times? Whether the moult was eaten ? Yes/No
Elaborate on the feeding habits of the caterpillar	
Did you notice any defense mechanisms in the caterpillar	
Description and size of Pupa/Cocoon	
Place of pupation	Soil/ leaf litter / twig / other
No. of days of spent in pupation	
Date & Time of emergence of butterfly/	
Did the caterpillar or pupa survive till the last stage	Yes/No
If No, what are the reasons? Please elaborate	
Description and size of the adult emerged	
Any photographs or illustrations	Yes/No
Any other observations	

Happy rearing your caterpillar!

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8. STUDYING MARINE LIFE ON THE SEASHORE

We enjoy our seashores in many different ways. Children paddle in the ripples, swimmers frolic among the waves, naturalists study plants and animals, local people collect seaweed and shell fish for food, and anyone may appreciate the beauty of unspoiled stretches of shore. However, our seashores are being damaged by their own popularity and by the increasing pollution of the sea. We have treated the sea as a bottomless dustbin, pouring into it endless amounts of sewage, waste, and chemicals, in the hope that somehow the sea would render them harmless. But the sea now shows signs of ill- health, and its shores display the evidence of damage. We must act now to safeguard our shores for the future. It begins with study and understanding. Anyone, who is interested in learning more about the marine wildlife should be equipped with right equipment and correct knowledge.

You would be surprised to know that no two seacoasts are quite same but by studying the tell tale marks on the shore life one can tell how high the tide rises, how low it falls, whether the area is exposed to wind and waves, or whether it is sheltered. The journey from the edge of the land to the beginning of the sea passes through a series of bands or zones, each with characteristic animals and plants that need to be covered by the sea for different lengths of time. The highest band is the splash or spray zone, which is above the high-water level of the highest tides and is occasionally drenches by spray. Land plants and animals that are adapted to salty conditions live here. Lichens, are found here as well as a few straying sea-snails. The lower limit of the splash zone is generally marked by barnacles, the first truly marine creatures. The next band is the inter-tidal zone i.e. between the tides, which is regularly covered and uncovered by water. It extends from the barnacles down through the seaweeds to the low-tide area, where larger sea-weeds begin to take over. The third broad band is the sub tidal zone i.e., below the tides, stretching from the larger sea weeds zone into the permanent shallows.

Frequent visits to the shore will provide you more information about the shore life. Before you start venturing into the nature's water kingdom, there are ten commandants for you to follow:

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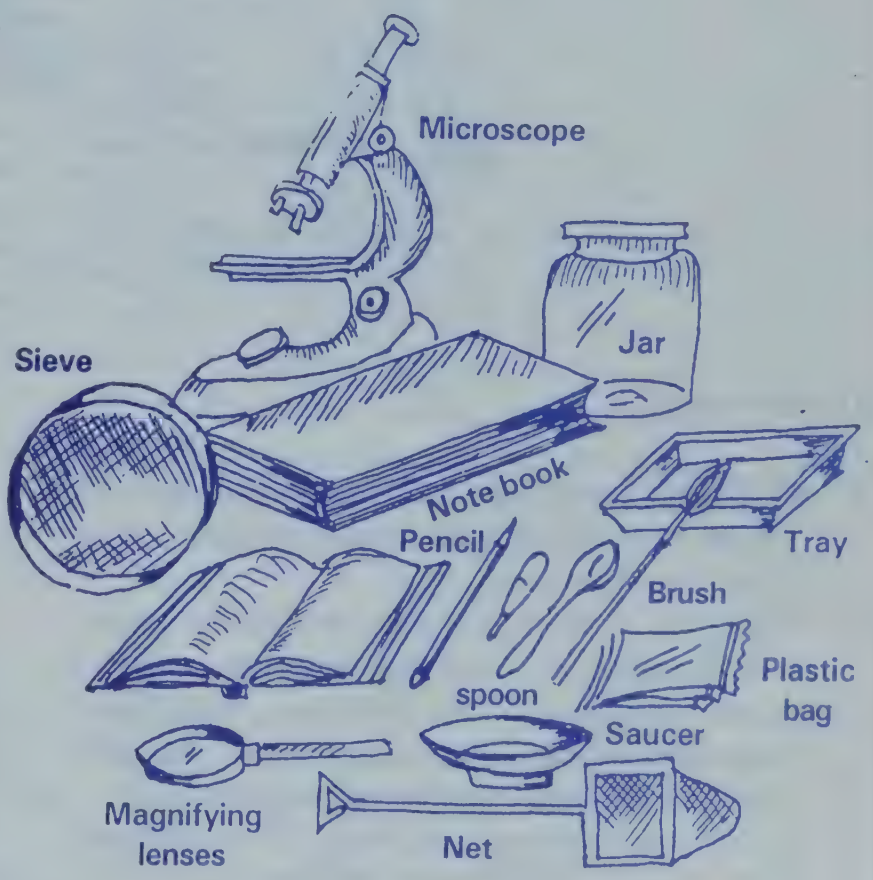

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Always carry

1. Field guide and note pad are vital. A pencil will not smudge and can be used to take down notes and drawings.
2. Magnifiers will enable you to identify small water creatures. A 10X lens would be prefect.
3. Screw-top glass jars will be useful for temporary storage and examination. Do not leave animals and plants in them for long.
4. Dishes and droppers will allow you to remove gently small living things without too much of disturbance.
5. Spoon and brush will enable you to transfer small, delicate plants and animals for study and then replaced without harm.
6. Nets with different mesh sizes, for large or small specimens. Exercise caution, so as not to uproot plants. After sorting, replace the net's contents in the water as quickly as possible.
7. White enamel pans are useful for sorting through debris caught in the hand net. A little of the debris is put into a pan half filled with water. The live animals are soon seen moving about over the white bottom. Forceps are most practical instruments for transferring specimens.
8. Aquatic plants dry out quickly in air. Keep them wet during transit in plastic bags.
9. A fine-mesh sieve can be rocked gently in water to sort small animals from mud and silt.
10. Lastly have a microscope, a drop of water may look clear, but under a microscope , it will be teeming with tiny water plants and animals. Magnification of about 20X to 200X is most suitable.

Have fun with seashore life!

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9. STUDYING POND LIFE

You would have come across many types of water-bodies. For example, ponds, stagnant pools, streams, rivers, lakes, sea. All these water bodies have one thing in common and that is water wherein exists a whole ecosystem that can be observed. There are not only fishes and crabs found in this water, but there are various plants and small creatures like shrimps, water skaters, scorpions and lot more. So do you want to find out the hidden treasures of the waters! Here is how to go about

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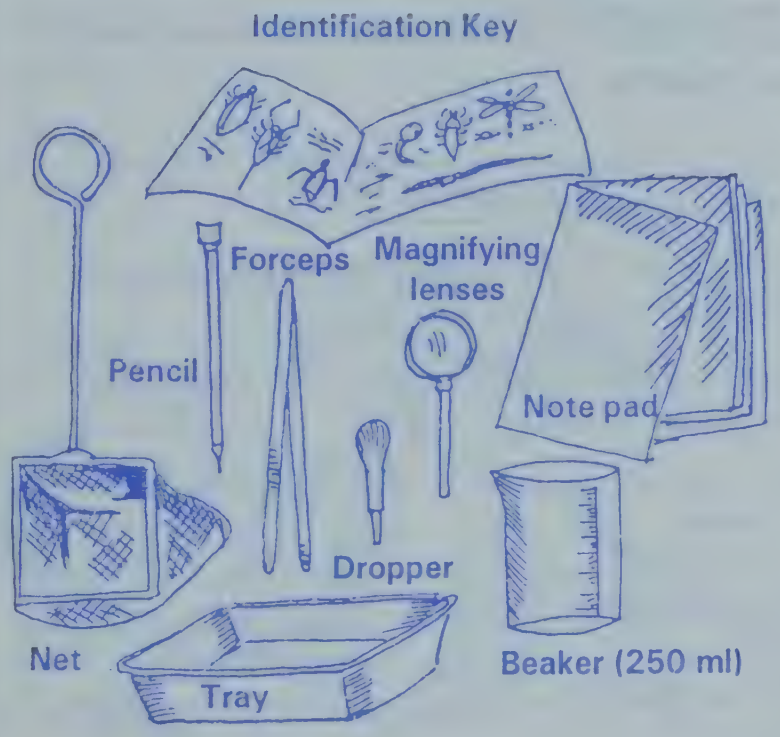

Select a water body which is to be studied. Take a white tray in one hand and net in the other. Now stand at the edge of the water body in such a way that water does not get disturbed. Now bend and put the net inside the water till it touches the bottom. Move the net inside the water from right to left once and immediately remove it out of water. Your net will be filled with quite a number of small pebbles and stones along with the soil. Throw them back in water and put the remaining matter on the white tray. Repeat this process for about two more times. Now keep the net aside and take some water and put it in the tray which has the collected matter. Take the empty, clean beaker and fill it half with clear water. Using a forceps, separate the insects or which ever creature is seen in the tray and put it inside the beaker. Once you separate them, make use of magnifying glass and see the structure of animal that is present inside the water. Find out the different body parts and try to write it down on the piece of paper. If possible you can also try to sketch the rough drawing of the same. Now take the identification key which gives you the details of the animal body part and discover the name of the creature that you found!

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You can use a microscope to see the microscopic creatures seen in the water. May be you can make use of the biology laboratory of school, for identification. Once your study is over, see to it that you do not killing the creature that you discovered. Release it back in the water. Because that is where it belongs.

Besides knowing the pond life you can also study how polluted is the water. The reference table below gives the degree of pollution present in the water in relation to the creatures found in it.

Name of animals	Level of pollution
Mayfly larva, stonefly larva	No pollution
Caddisfly larva, freshwater shrimp	Slight pollution
Water louse, bloodworm	Medium pollution
Sludge worm, rat-tailed maggot	Bad pollution
No life found	Very bad pollution

Happy pond dipping!

10. PAINTING EGGSHELLS

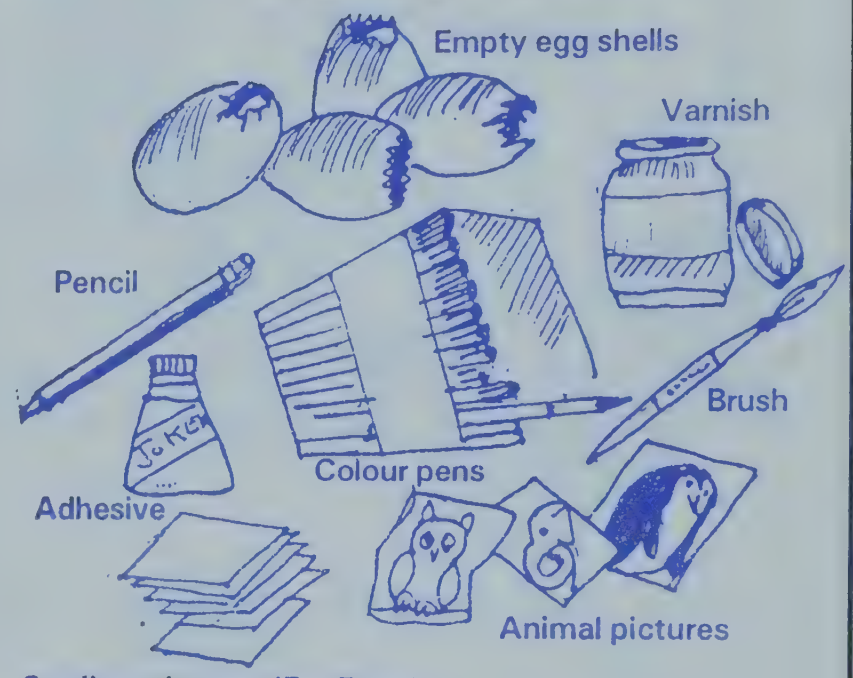
What do you do with the empty eggshells- throw them? well this time do not throw but put them aside to paint animals and birds on an the egg shells.

While using eggs, break only the lower portion and keep the remaining eggshell (vertical, oval portion) intact. Wash the egg thoroughly and dry it in the sun. Take the picture of any animal, bird, insect, fish, amphibian or reptile that you want to paint. Draw the picture on the eggshell with a pencil. Take care that you do not exert pressure on the egg shell least it breaks. Once the sketching is over colour the picture with sketch pens and coat it with a light brush of varnish (to give it a fresh look and a bright sheen). If you want you can write a small slogan on top; like " Save Nature", "Tigers in Wild", "Wild beauty", "Bird paradise" or make a series of nature paintings and name them as "Beautiful people!!" Take a piece of card board paper (5 x 5cm) stick the egg shell on the card board with any good adhesive. Your egg-painting is ready. Gift it to your friend, teacher, parents ... to anybody whom you like and spread the message of love and care for nature !

So, all the best and let your imagination go wild.... with nature!!!

Happy painting!

YOU WILL NEED



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11. GREENING YOUR AREA

Trees are indicators of healthy environment. If your locality has good number of trees around, then you are certainly breathing cleaner air, and if there are few trees around then make efforts to plant more trees.

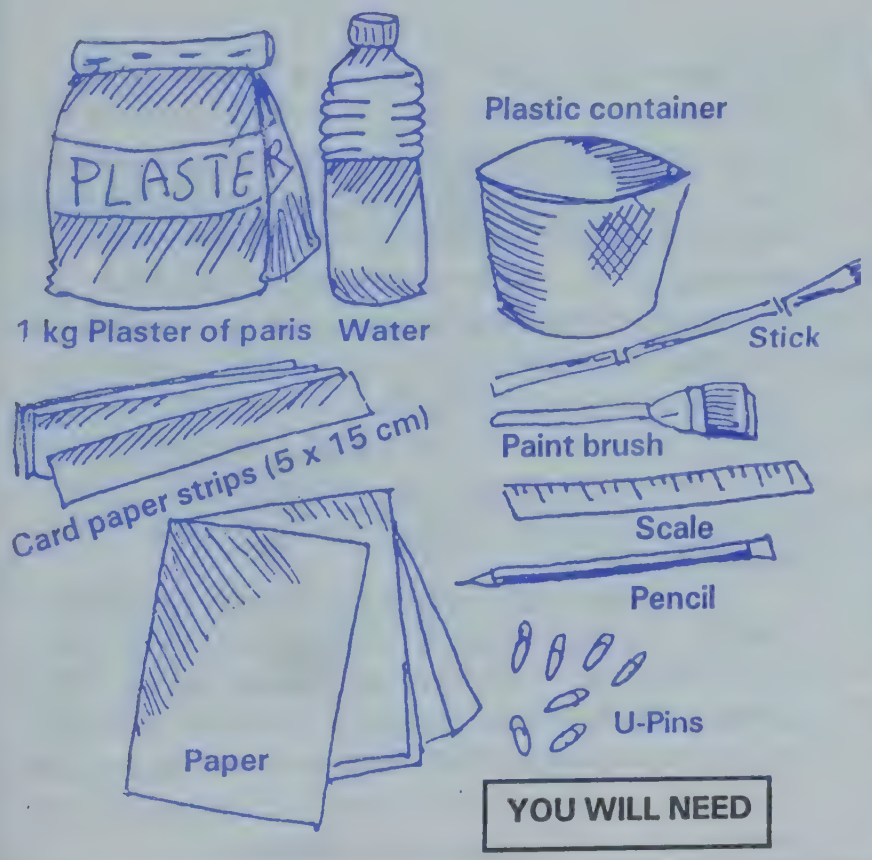
If your are interested in knowing the different types of trees existing in your area and you also want to gauge how green is your area? Then follow this small exercise :

Collect the individual leaf from each tree. Spread the leaves between newspaper sheets and place some heavy books on them or best, keep them beneath your bed. Leave them for a week, during this process, the leaves will be completely dried and flattened, maintaining their original shape. Remove them carefully and individually paste them on a card paper. After pasting all the leaves, take your leaf chart to a botanist or a teacher and get the them identified. Write the respective names under each leaf and cover it with a transparent cellophane sheet and now your leaves chart is ready. Now count the number of leaves pasted on your chart and rate your locality as under :

1. **Less than 5 trees** : Your area needs greening. Take up tree plantation activities and make your area green.
2. **Less than 10 trees** : Green area, but not sufficient enough to curb the air pollution. Do some tree plantations.
3. **More than 15 trees** : Ideally a green area. Try to maintain the number and no tree cutting should be allowed.
4. **More than 25 trees** : Congratulations! You are almost living in a forest.

Note : Also calculate, which is the most dominant tree in your locality. Observe which kind of life is associated with your trees (e.g. birds, insects etc.). Ensure that for tree plantations only indigenous trees (e.g. Mango, Neem, Coral tree etc.) are planted. Do not plant any exotic trees (e.g. Eucalyptus, Australian Acacia, Copper pod etc.) which usually doesnot support any life on it. ***Happy greening !***

.....



12. MAKING A PLASTER CAST

An easy way to study animal tracks is to make plaster casts of them and take them home with you. The best places to look for tracks are in mud or wet sand. The plaster cast method is one of the commonly used methods for estimating the animal population in wild. But before collecting different prints why not practice by taking casts of your pet's paw prints.

Find out a fresh foot print which is not much disturbed such as a dog or cat paw, cattle hoof or bird feet. Then clear the soil around the footprint. Now take one card board strip and make it into a circle and fix its ends by u-pins. Keep the cardboard frame around the foot-print/pug-mark. Now take 20 spoon full

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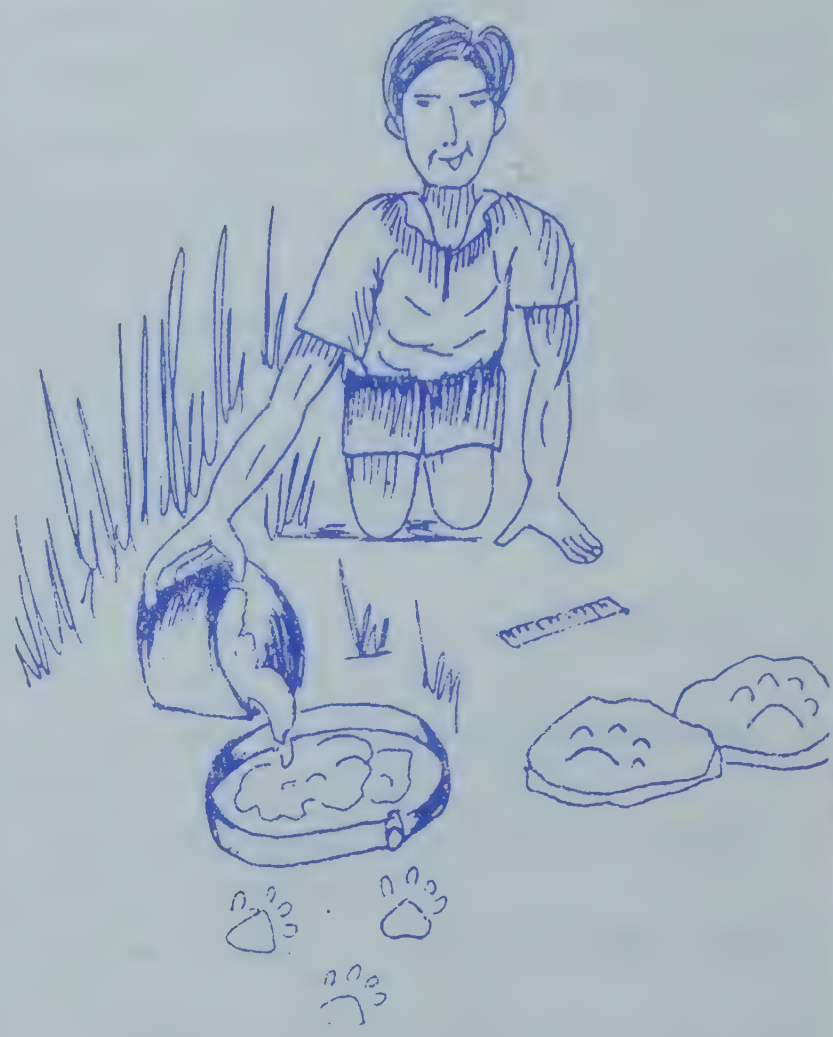
of plaster of Paris in the container. Slowly add half glass of water. After adding, stir and see the consistency of the liquid. Take care that it should be as thick as a flowing paste. Once the viscous liquid is ready, do not waste time as the plaster of Paris dries up very soon. Pour the liquid plaster of Paris inside the frame from one corner. And let the solution cover the frame fully. See to it that the liquid spreads evenly inside the frame covering the foot-print. Wait till it gets dried up completely. It should take maximum 35-40 minutes after pouring. Once it gets dried, remove the frame first by unlocking the free ends by removing pins. Then pierce a stick from upper surface to see whether it is dry inside. If it does not goes inside, that means it is dried and ready to be removed. Your plaster cast is now ready. Lift up the whole cast, turnit over. Remove the dirt with the help of dry brush. Measure the length and breadth of the foot print with the help of scale and try to sketch it on a paper.

You can visit different national parks or sanctuaries and after seeking appropriate permissions you can try to take plaster casts of different foot prints that you come across. Collect such foot prints, find out other details and make a wildlife diary for your record. ***Happy tracking!***



13. MAKING HANDMADE PAPER

Paper is one of the most used material in our daily life. As we all know that paper is made up of wood which means trees are cut to make paper. But we can make paper even without cutting trees i.e. the handmade paper. We can make our own handmade paper which can be used for greeting cards, book tags, gift wrapper etc. You will need old newspapers, container/ tub, flat vessel or tray, scissors, water, mixer, sieve, knife.

Collect some newspaper and cut them into small pieces with the help of scissors. Now take a tub and fill it (with plain water. Now soak the pieces of paper in the tub filled with water. Allow them to soak completely for almost one week. After one week, take a mixer and put the soaked paper to mixer for a fine paper pulp. Once your paper pulp is ready, you can make the paper of various thickness. Now take a flat tray and take four table spoons of paper pulp, add one glass full of water to dilute the pulp. Take a sieve, hold it with both the hands and place it at the bottom of the tub and remove it in such a way that the dilute pulp is spread all over the sieve. Let the water drip down from the sieve and only the pulp remain on the upper side. Keep this sieve in the sunny place and let it dry. It takes four to five hours for paper to dry completely. Once the paper is dried, take a knife and run the pointed end from the sides of the sieve. Now slowly try to separate the paper and sieve. That's it, see what you have in your hand ! A handmade recycled paper!

The paper that you get will be grey in colour. To make a coloured paper, you can add few drops of poster colour. You can also make paper with different patterns by using oil colours. Now let your creativity go wild and use this paper as creatively as possible.

Happy paper making!

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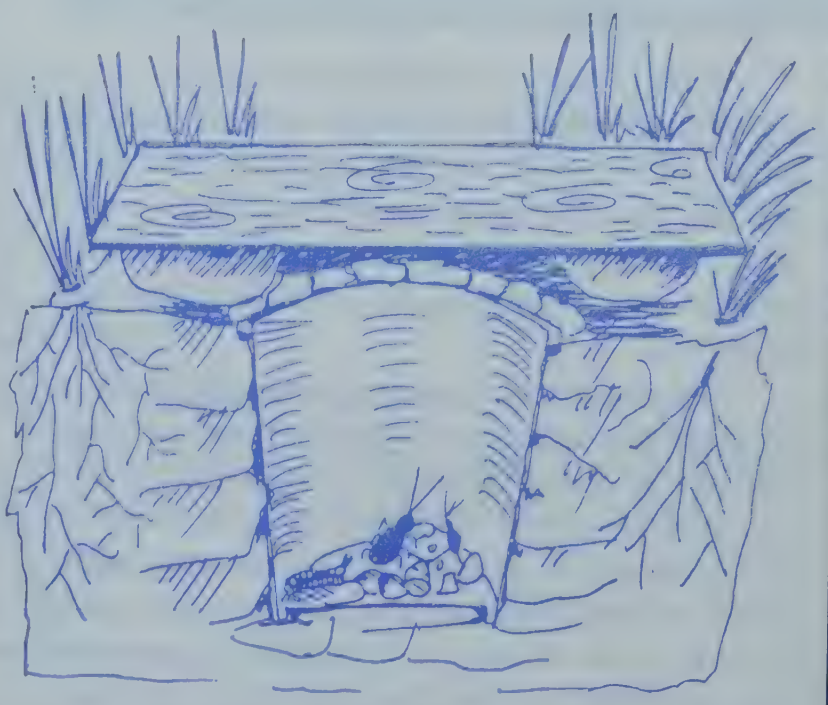
14. STUDYING ANIMALS AROUND YOU

You do not have to go far to find animals to watch. There are tiny creatures all around you in your garden or park. To find out what they are, set up simple pit traps. Check the traps often and write down what you find, to keep a record of local wildlife.

Dig a hole in the garden. Sink the yogurt pot into it, so that its rim is level with the soil. Fill in soil around the edges of the pot. Drop a small piece of cheese or other bait into the yogurt pot trap. The smell of the bait will attract small creatures to the trap. Put the four stones around the top of the yogurt pot. Lay the piece of wood across them to make a protective cover for the trap. The cover of the pit trap protects the insects and other small creatures inside it from bright sun, the rain or any hungry animals on the prowl. Everyday empty the creatures in the trap into a dish. Write down what you have caught in your nature diary, then set the creatures free. Try setting several traps, using different baits, such as meat, fish or fruit. Do different types of bait attract different creatures. To see which creatures live where, sink traps in different places: in a flowerbed or vegetable plot.

Happy knowing animals!



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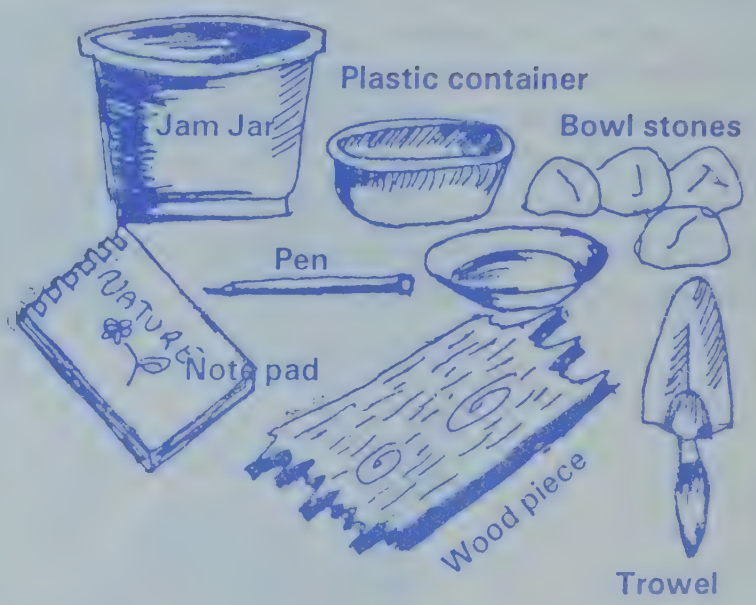

15. MAKING BADGES AND SLOGANS

You must have seen your school badge, with a symbol in between and a saying or a slogan or a message in an advertisement. Have you wondered how they are made? Or do you feel that the existing slogan or the message which your school or any other company uses can be changed ? Well then, here's your chance to make a cool and a catchy message which will also have a lovely picture or a symbol of your choice !!

You will need a card paper, old greeting cards, pencil, colour crayons or sketch pens, safety pins. Take a small piece of recycled paper (5 x 5 cm). Decide a picture and the message that you want to convey to your friends and people. Write the short messages (not more than 12 words) on a rough paper separately. Now start drawing the picture, and then colour it. While you draw and write the message see to it that they are bold enough to be seen and understood from a distance. Once the drawing and colouring work is over, fit the slogan on the badge where you feel it can attract attention. Pin it up on your dress to carry it where-ever you go and convey your "Green Message" to everyone! Make as many badges as you want!

Go ahead and become wildlife copy-writers!

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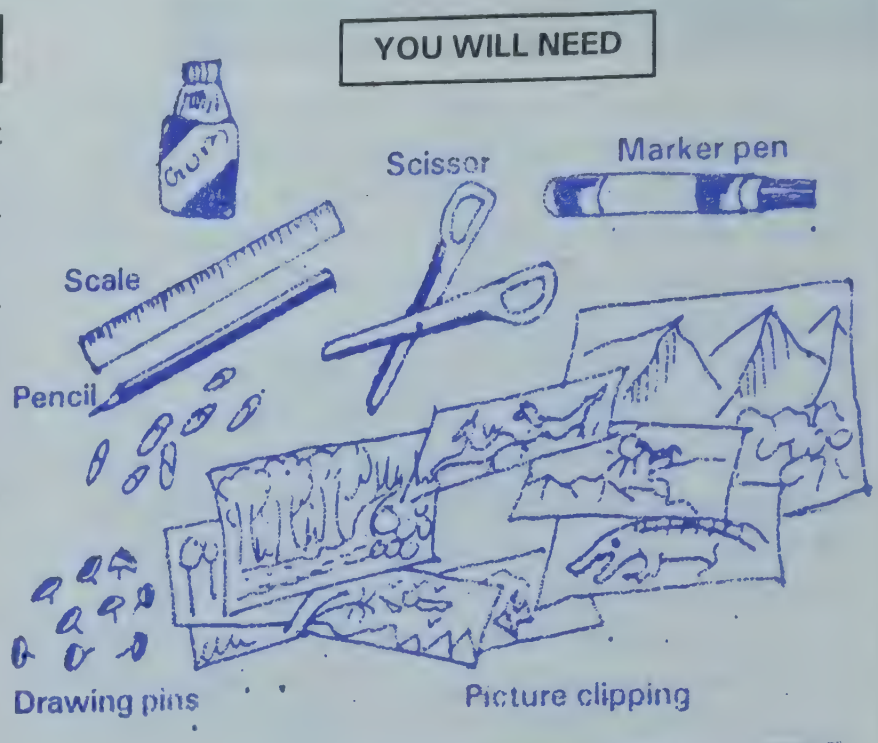
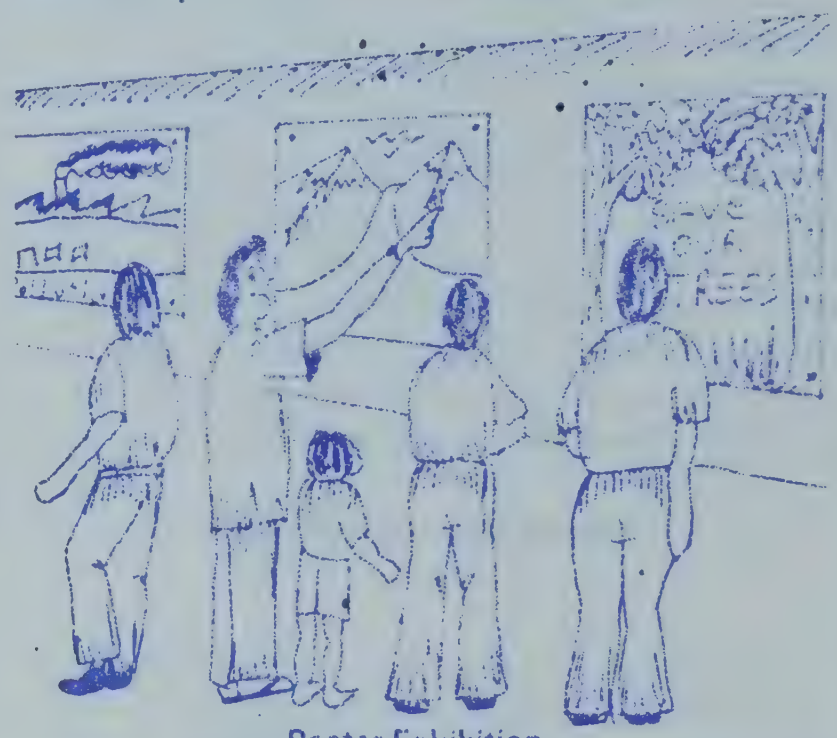
16. MAKING A POSTER ON CONSERVATION

Posters play an important role when it comes for creating awareness among the people. Display of theme based posters have been very effective medium of communication. You can design your posters on threats faced by our wildlife and environment and even hold an exhibition.

Before making a display poster think about the place you are going to display your material then ask for the permission. Enquire about the area where you will be mounting your display. Make a rough diagram of the area and measurements. Find all the pictures you need to make your display, old wildlife magazines such as Hornbill, Sanctuary, Cub or National Geographic or any other source. Also work out what you want to say. Think upon a good slogan or title for the display. If attractive you need captions for the pictures you are displaying-keep them short. Paste the pictures onto card. This looks good and will help your display last a long time. Finally go and put your display up - don't forget the pins. Drawing pins are best, but check with the owner or manager of the place how best to put up your display.





Frequently occurring problems with solutions during the display:

Problem 1: People will only stop to look and read a display if it is attractive.
Solution : To make it striking, use pretty pictures, big lettering or other eye-catching ideas.
Problem 2: People may stop and look but not read or take in your message.
Solution : Do not use too much material and especially words. Just a few pictures and very short but sharp message will do. If you want more information put captions beside the pictures which inform people about the problems wildlife is facing. If people want to read captions they have the opportunity, but if not the title or slogan should give them an idea.
Problem 3: People may stop to look and read but have you left them with all the information they need to know?
Solution : Make a feedback form wherein people visiting your display will express their views. If they feel strongly about your message then something constructive can be done about it. ***Happy awareness creation!***

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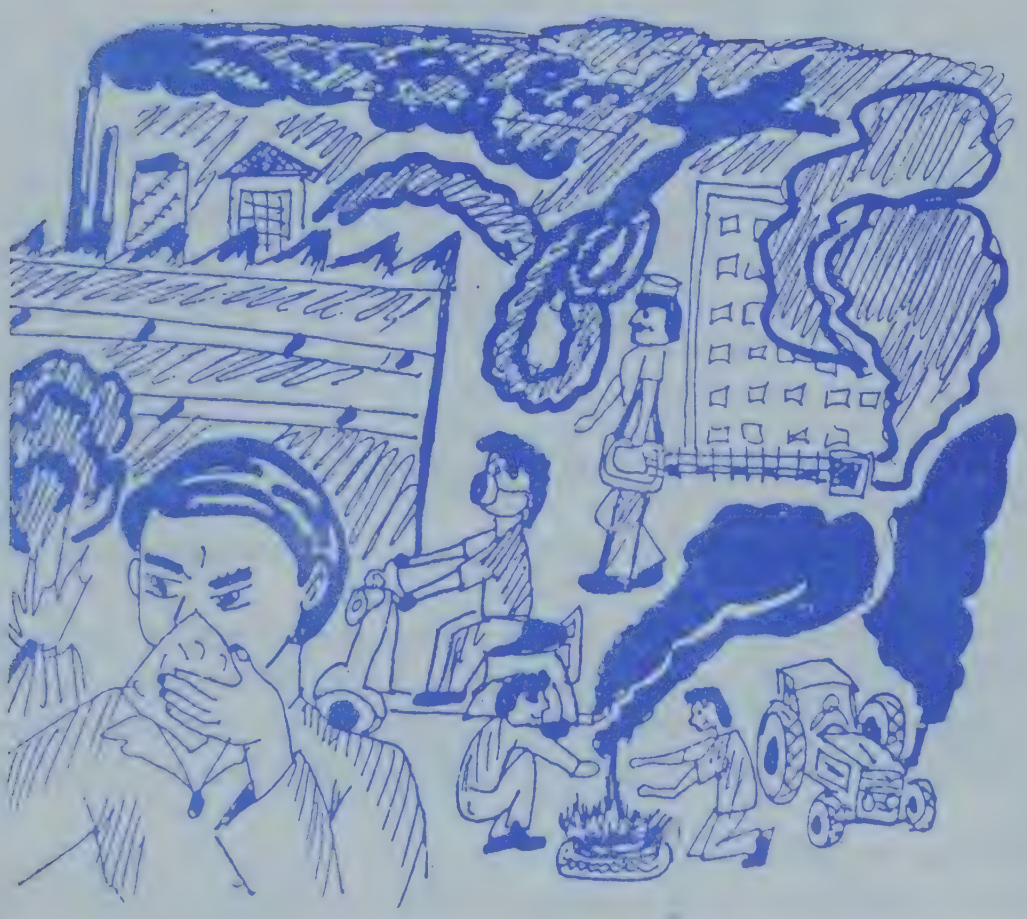
17. STUDYING AIR POLLUTION

Air pollution is mainly caused by domestic and industrial emissions of gases and solids. Some of these gases dissolve in rain-water to form weak acids (so called 'acid rain'). If you are interested in knowing the quality of air you are breathing in, please follow the following steps and find out whether the air around you is healthy or not.

Air contains solid particles that escape from the industrial and domestic chimneys. To study these particles one or more of the following activities might be selected.

* Clean a window sill and observe it over a period of time
* Attach a piece of paper to a surface outside and observe it over a period of time.
* Place some two sided tape outside for a period of time. Observe it closely with a hand lens or under microscope. What shape are the particles? Are they similar is sizes? Check out.
* Collect some leaves and look at the surface with a hand lens. Try to remove and collect the dirt.. This may be achieved by firmly attaching sticky tape to the leaf and then peeling it off. The tape may be mounted on white paper or observed under the microscope.
* Go on lichen hunt. The presence or absence of particular types of lichens gives a measure of the amount of air pollution as shown below:



Type of Lichens	Level of air pollution
1. Shrubby lichens	No air pollution
2. Leafy lichens	Slightly polluted air
3. Only crusty lichens	Fairly polluted air
4. No lichens	Very bad air pollution

Be a spy for air pollution!

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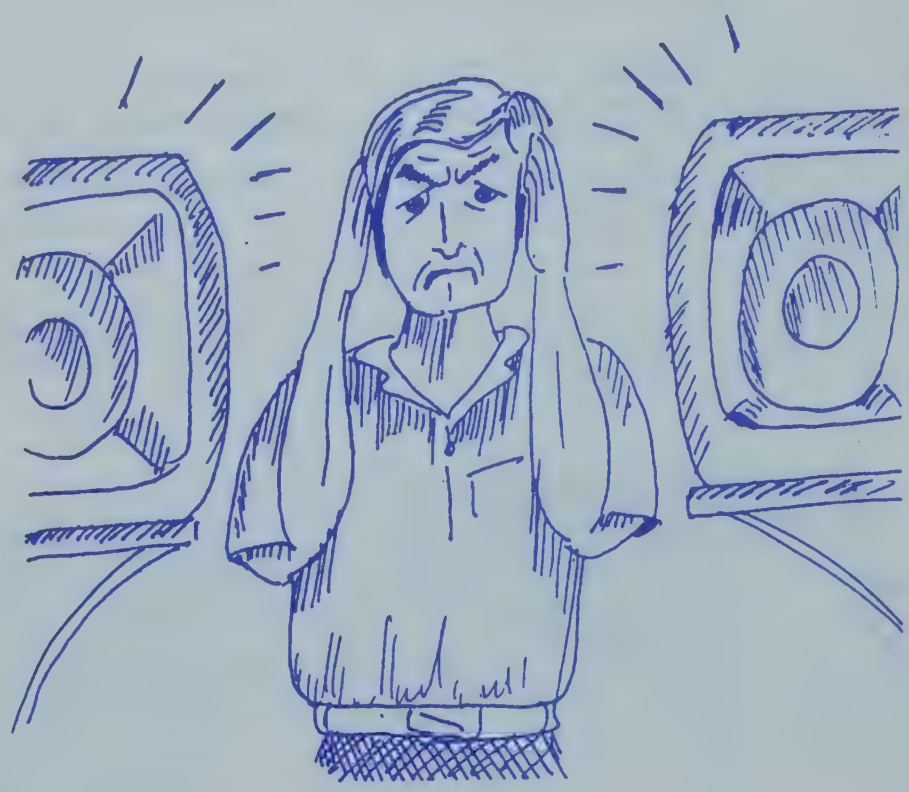
18. STUDYING NOISE POLLUTION

Noise may be defined as the sound that is unpleasant and unwanted by the listener. Excessive noise causes distraction, annoyance and even torture. Depending on the intensity and duration of sound the hazards are still serious. The person exposed to such types of noise may suffer from temporary or permanent noise-induced loss of hearing. In addition, it also leads to many psychosomatic disorders, tension relate diseases, mental illness and emotional distress. It is also estimated by the scientists that if the present noise pollution continues with the same pace for few decades then the future generations may be even born deaf !



Now you know about the harmful effects of noise pollution on us. But do you know that trees can help us in curb the noise menace. We can prove this by the following experiment.

You will need a row of shrubs, portable cassette player, and a song cassette, sound level meter, measuring tape.

First locate a line of shrubs. Place the cassette player on one side of the shrubs and play the song cassette. The volume should be turned up very loud. Stand on the other side of the shrubs and measure the sound by using a sound level meter. Observe the average sound level and the loud peaks in the music. Measure the distance between you and the cassette player by the measuring tape.

Next, place the cassette player at the same distance from you, but this time do so in a clear area where there are no shrubs or other barriers between you and the sound source. Note the readings and calculate the difference between two readings.

The difference will show that when there was the shrub barrier between you and cassette player, the noise produced was less whereas when the shrub barrier was absent, the noise levels were high.

The above experiment proves that bay having more trees around us, noise pollution could be under control, so why not increase the green cover around you and protect yourself from hazards of noise pollution. ***Voice out against noise pollution!***

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19. STUDYING PAPER WASTAGE IN SCHOOLS

This is a small project, which involves a week's work wherein three groups of students (4 each from different standards) will be estimating the paper wasted during exams. For this project you will need permission from your principal and help from your colleagues.

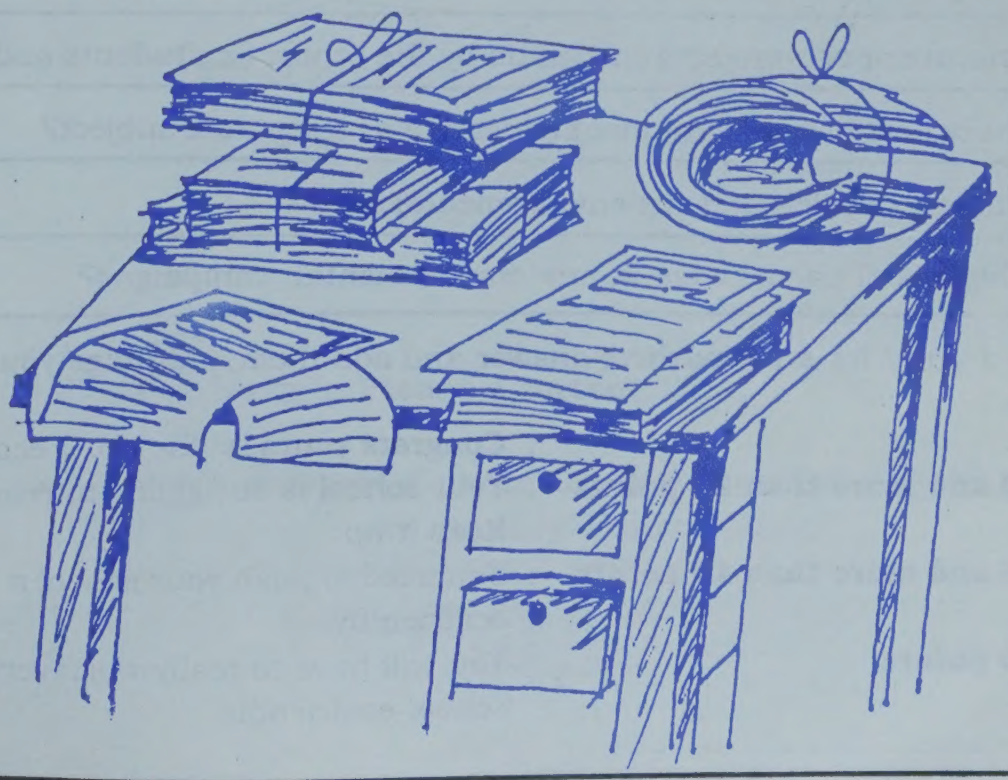
You can start this project after declaration of result of semester, if this is not possible you can at least start with the last unit test papers. Collect the answer papers of each subject from three different standards say 5th, 6th, 7th of all students. Find out the paper used and wasted with help of the chart given below. Pool the results of all three groups.

No.	Standard	Paper used (no. of pages)	Paper wasted (no. of pages)	Total (no. of pages)
1.	V			
2.	VI			
3.	VII			

After tabulating your information you can work out the percentage ratio of paper used and wasted. Find out the reasons for wastage of answer papers by answering these questions;

1. Were there too many papers in one answer sheet compared to the questions asked? If yes then the number of pages in one answer sheet should be reduced.
2. Have students left blank pages in between answers written? If yes, students should be instructed before their exams to use the paper to the maximum extent.
3. Did students take excess supplement and did not use? If yes, such incidents Should be dealt strictly either by warning such students or by Giving negative marks.

Once your group is ready with all these findings you all can write a report on how to minimize the paper waste with consultation of your principal. May be your small project would be an eye-opener. Remember paper is made out of wood taken out from trees and trees are our friends. Make best possible use of paper and protect our friends. ***Happy saving paper!***



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20. RATE YOUR SCHOOL

How environmentally aware is your school? Conduct this survey to find out.
Next to each question, put a tick for 'Yes' and a cross for 'No'.

1. Does the school have a garden?	
2. Is the garden waste used to prepare compost?	
3. Is recycled paper used in classrooms?	
4. Does the school office use recycled paper and envelopes?	
5. Is the old paper reused (like empty pages in the notebooks of the previous years or computer paper as rough paper)?	
6. Do most of the children use refillable ink?	
7. Are solar powered calculators used?	
8. Are lights switched off when not needed?	
9. Are taps closed after use and opened for a slow flow?	
10. Are leaking taps repaired immediately in the school?	
11. Do students and teachers use cloth bags instead of plastic bags?	
12. Is the canteens kitchen waste used for making vermicompost?	
13. Is any waste collected for recycling?	
14. Is the noise level in the school within the permissible limits	
15. Does the school library provide books on environmental issues, nature or wildlife?	
16. Does the school have a Nature Club?	
17. Is any nature or eco-projects carried on by the school for students and teachers?	
18. Does the school have environment education as a separate subject?	
19. Does the school celebrates the environmental days ?	
20. Does the school participates in any environmental campaigns?	

Give yourself 1 point for every positive answer and add them and judge yourself here.

20 points : Congrats yours is the no. 1 eco-friendly school

Less than 20 and more than 15 points : Your school is struggling to reach the no.1 position. Keep it up

Less than 15 and more than 10 points : You need to push your school a bit to be comfortably ecofriendly.

Less than 10 points : You will have to really work very hard to make your school ecofriendly.

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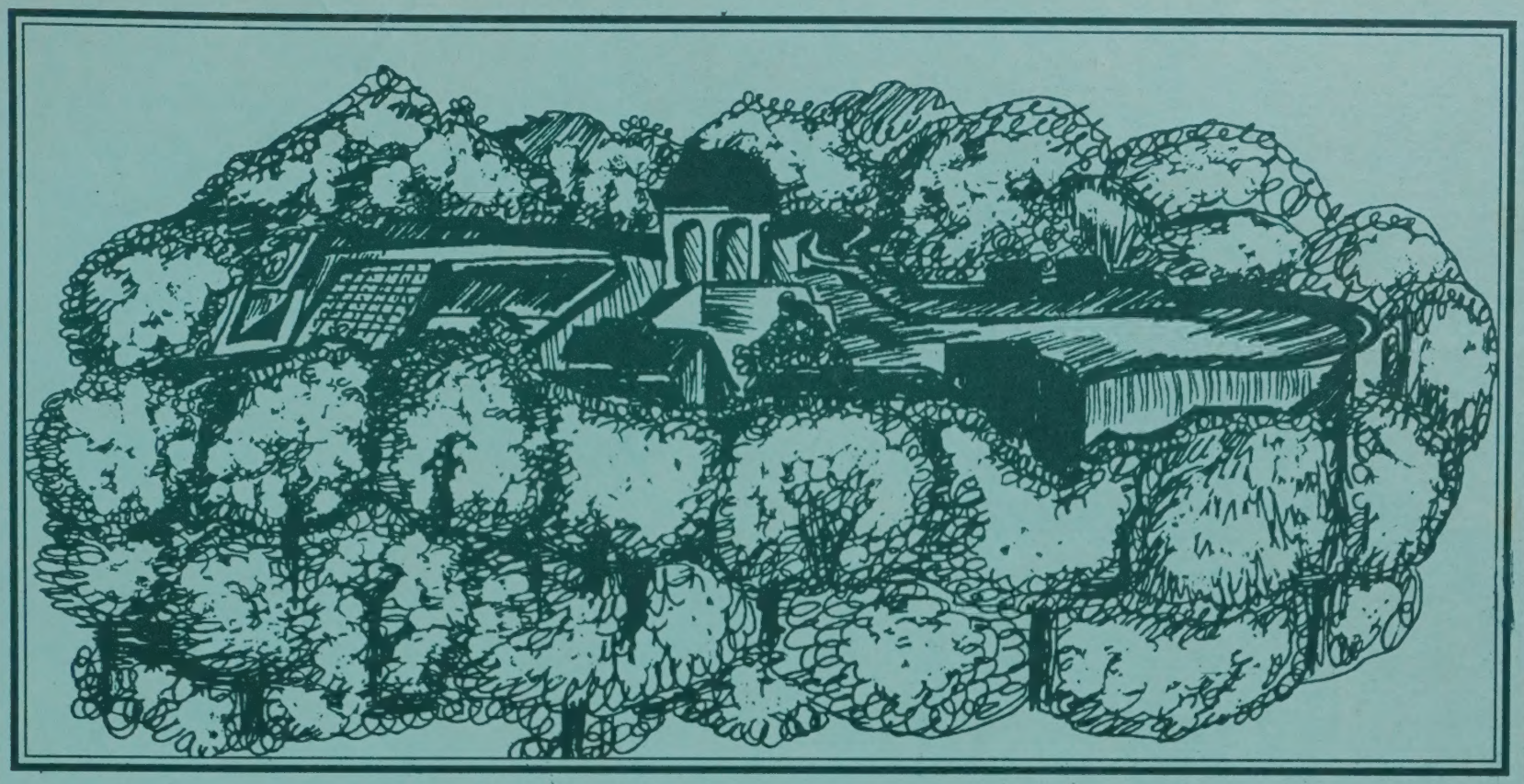

CONSERVATION EDUCATION CENTRE

Nature education has always been, a primary concern of the Society. The Conservation Education Centre (CEC) has been established in Mumbai at Goregaon end to develop a broad-based support of people for conservation of biodiversity. The Centre conducts innovative and interactive educational programmes for different target groups such as children, teachers, teacher trainers, NGOS, corporate groups, government officials. The Centre has been designing and disseminating educational resources to spread awareness about biodiversity conservation. The versatile and enthusiastic team of educators make the joy of learning even more enriching. You are welcome to bring your students for a day's outing at our Centre. Let your students experience nature at close quarters !

For Details Please Contact:

Bombay Natural History Society, Conservation Education Centre,
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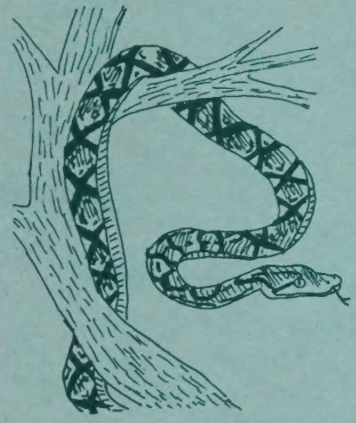
Goregaon (East), Mumbai - 400 065.
Tel.: 022 - 2842 1174 / 2840 2946
e-mail: cecbnhs@vsnl.com

JOIN BNHS TO SAVE NATURE

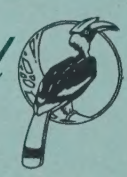
BNHS Mission

Conservation of Nature, primarily biological diversity,
through action based on
research, education and public awareness.

Are you concerned about the endangered wildlife? Do you feel sad that we lost Cheetah? Does the tree cutting bothers you? Are you willing to do your bit to save your environment? Are you ready to adopt ecofriendly ways in your daily life? If the answers for these questions is YES, then we need you as our member. Today like-minded and concerned people are making a difference to save nature. Even you can make a difference!



Bombay Natural History Society



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